6.4 Tools and Strategies to Solve Equations with Exponents

p. 368- 375

Solve for a Variable Raised to an Exponent
p.368

Solve for a Variable Raised to an Exponent

A cylindrical storage container with volume 5000 m^3 has a radius equal to its height. The volume, V, is related to the radius, r, according to the equation $V = \pi r^3$. Determine the radius and height of the container to the nearest tenth of a metre.

Mar 24-11:12 AM

6.4 Tools and Strategies to Solve Equations with Exponents

p. 368- 375

Solve for a Variable Raised to an Exponent
p.368

Solve for a Variable Raised to an Exponent

A cylindrical storage container with volume 5000 m^3 has a radius equal to its height. The volume, V, is related to the radius, r, according to the equation $V = \pi r^3$. Determine the radius and height of the container to the nearest tenth of a metre.

$V = 5000$

$V = \pi r^3$

$\frac{5000}{\pi} = \frac{\pi r^3}{\pi}$

$\sqrt[3]{1592.4} = \sqrt[3]{r^3}$

11.7

11.7

$\sqrt[3]{1592.4} = r \Rightarrow 11.7 = r$

1591.5

Mar 24-11:12 AM

Solve for a Variable Exponent p.369

Solve for a Variable Exponent

Lena has inherited $1000. She decides to invest it into an account that pays 7.5% per year, compounded annually. The amount of the account, A, can be determined using the equation $A = 1000(1.075)^n$, where n is the number of years the money is invested. Approximately how many years will it take for Lena's money to double in value?

Apr 13-8:20 AM

Solve for a Variable Exponent p.369

Solve for a Variable Exponent

Lena has inherited $1000. She decides to invest it into an account that pays 7.5% per year, compounded annually. The amount of the account, A, can be determined using the equation $A = 1000(1.075)^n$, where n is the number of years the money is invested. Approximately how many years will it take for Lena's money to double in value?

$A = 2000$

$n = ?$

$A = 1000(1.075)^n$

$2000 = 1000(1.075)^n$

Isolate n

$\frac{2000}{1000} = (1.075)^n$

$2.0 = (1.075)^n$

Estimate n

$2.0 = (1.075)^{10}$

n	Base	Soln
10	1.075	2.06
8	1.075	1.78
9	1.075	1.92

Your investment doubles between the 9th and 10th year. (9.6 or July of the 9th year)

Apr 13-8:20 AM

Solve a system of Exponential Relationships using the Pt of Intersection

Example 3 **Solve an Equation With More Than One Exponential Expression**

The populations of two towns, Telmira and Dancaster, are each described by an equation relating population, p, in thousands, to time, d, in decades following the year 1950.

Telmira: $p = 5 \times 2^d$

Dancaster: $p = 3^d$

a) Determine the population of each town in 1950.
b) When will the towns have the same population? What is the population?

Apr 13-8:23 AM

Solve a system of Exponential Relationships using the Pt of Intersection

p. 370

Example 3 Solve an Equation With More Than One Exponential Expression

The populations of two towns, Telmira and Dancaster, are each described by an equation relating population, p, in thousands, to time, d, in decades following the year 1950.

Telmira: $p = 5 \times 2^d$

Dancaster: $p = 3^d$

a) Determine the population of each town in 1950.
b) When will the towns have the same population? What is the population?

$d = 0$ (1950)

$T \Rightarrow p = 5 \times 2^0$

$p = 5 \times 2^0$

$p = 5 \times 1$

$p = 5$

Pop = 5000

$D \Rightarrow p = 3^d$

$p = 3^0$

$p = 1$

Pop = 1000 people

Apr 13-8:23 AM

Solve a system of Exponential Relationships using the Pt of Intersection

p. 370

Example 3 **Solve an Equation With More Than One Exponential Expression**

The populations of two towns, Telmira and Dancaster, are each described by an equation relating population, p, in thousands, to time, d, in decades following the year 1950.

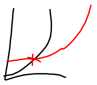
Telmira: $p = 5 \times 2^d$

Dancaster: $p = 3^d$

a) Determine the population of each town in 1950.

b) When will the towns have the same population? What is the population?

b)



$5x2^d = 3^d$

Graph

Calc Pt of Int

3.97, 78

$3^d = 5 \cdot 2^d$

d = 1

d = 6

d = 4

$3^4 = 5 \cdot 2^4$

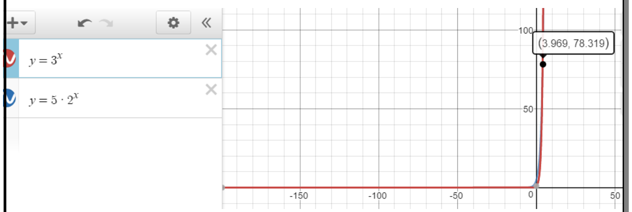
81 = 80

∴ Just before 1990 both populations reach 78,000

Apr 13-8:23 AM

In 1990 ; both towns will have a pop of 78 319.

Apr 24-10:09 AM



Nov 10-12:25 PM

Key Concepts

- There are a variety of tools and strategies that can be used to solve equations involving exponential expressions. The choice may depend on where the variable appears.
- To solve an equation where the variable is an exponent, use systematic trial or graphing technology.
- To solve an equation where the variable is raised to an exponent, n, take the nth root of both sides of the equation.
- To solve an equation with more than one exponential expression, use graphing technology.

Apr 13-8:26 AM

Hmk. p. 373 -375
q. 1-7, 9 ,10 & 12*

Mar 8-7:37 AM